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## **4.0 SCOPE OF MAINTENANCE WORK**

### **4.1 Substation**

The substation maintenance work mostly involves in maintaining transformers, circuit breakers and protection equipment. All the maintenance work for these equipment are scheduled yearly, monthly and weekly. When immediate attention is required to maintain these equipment, unscheduled maintenance work will be conducted. The transformers under the Transmission Maintenance Department (Kuala Lumpur) ranges from 5 MVA to 240 MVA.

**Appendix 3** shows the checklist for maintaining Transformers, Circuit Breakers and Protection equipment. The maintenance work is described in the checklist.

### **4.2 Overhead Line**

The type of jobs in the Overhead Line section are:-

- a) Overhead Line maintenance work,
- b) Tower Footing Resistance & Tower Leg Maintenance,
- c) Beacon Light Maintenance,
- d) Rentice Patrolling and supervising contractors.

The overhead line maintenance work are mainly:-

- a) tower top inspection, which requires the workers to climb the tower to inspect of the crossarms, fittings, insulators, dampers, and arching horn. Line outage is required for this job.

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- b) line crossing, checks the line clearance over river crossing, road crossing, railway crossing, and highway crossing using a tele-height equipment. Under normal circumstances, sufficient clearance has to be maintained at the public crossing according to the 'Jabatan Bekalan Elektrik' regulation. Should there be any line with insufficient clearance, it will be restrung to the minimum required clearance.
- c) Tower footing resistance is mainly checking the insulation level of the tower footing. In normal cases, the required resistance level for the tower footing is 10 ohm. Should there be a higher resistance level than this reading, tower leg maintenance will have to be conducted. The earthing of the tower leg will have to be modified to get the reading below 10 ohm. This could be done by putting additional earthing or adding chemical to the ground to improve the reading.
- d) For towers near the airport, the regulation 'Jabatan Bekalan Elektrik' requires that beacon lights be installed at the top of all towers. This regulation is an international requirement to prevent accidents to aircrafts. The department has about 102 such towers which are located near the Sungai Besi Airport. This beacon light is powered by solar. Routine maintenance work is inspecting the function of the light, the solar panels and batteries.

Another section deals with supervising contractors on rentice clearing and patrolling work. Rentice, which is also called electrical reserve, is the

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area underneath the overhead lines. The size of the area is two square chains. One chain is 66 feet wide. The rentice is always grown with 'lalang', bambo, trees, undergrowth and bushes. The department will have to ensure that all growth within the rentice is less than 8 feet high. This is to ensure that the trees will not grow beyond the safety electrical clearance and cause tripping.

It has been a practice of the department to privatise the rentice clearing and patrolling work for the past 4 years. Rentice clearing means clearing all the trees and undergrowth within the area once in every six months. As it is a non-core activity, the department has engaged outside contractors to do the work for a trial period. It has been proven that a private company can do the work faster, cheaper and more efficiently than the TNB workers. Hence, the management decided to privatise it permanently. Following that, the TNB staff who formerly did the job now supervise the contractors' work.

The rentice patrolling job concerns patrolling the line. The scope of work comprise inspection of the lines' installation, third parties activities and centre path clearing. Inspection of lines installation includes visual checking of fittings, counting insulators, tower leg and line clearance. Third parties activities are all activities that are illegal and dangerous such as building houses, that can cause danger to the line installation or human beings. The patrol team comprise 7 teams with 3 personnel and a 4 x 4 vehicle per team cover its own area. Each team will supervise the job.